

The Honorable Commissioner of Patents  
and Trademarks

Page 9

**REMARKS**

The present application has claims 1-24, 26 and 28-30.

The Examiner objected to the disclosure, because "receiver 15" on page 10, line 5 is shown as "receiver 17" in Figure 1. It is respectfully submitted that "receiver 15" on page 10, line 5 was amended in the previous response dated February 18, 2003. The Examiner is respectfully requested to withdraw this objection.

The Examiner rejected claims 1-24 under 35 U.S.C. 112, first paragraph, because "the receiver being unresponsive to receipt of any other packets from the transmitter" in claims 1, 7, 11, 15, 17, 20 and 22 is not supported by specification. Applicant has amended claim 1, 11, 15 and 22 to clarify that the receiver is unresponsive to any packets from the transmitter unless the receiver detects the missing packet. Applicant has amended claim 7, 17 and 20 to correspond to the changes to claims 1, 11 and 15. Support for the amendment can be found on page 9, lines 2-4 and on page 14, lines 13-17. The Examiner is respectfully requested to withdraw the rejections under 35 U.S.C. 112, first paragraph.

Claims 1, 15, 22 and 26 have been amended to replace "a congestion window" with "a TCP congestion window". Claims 1, 7 and 22 have been amended to replace "missing data packet" with "missing packet". Claim 4 has been amended to recite a step of increasing the congestion window in response to the round-trip timer. Claim 5 has been amended to recite that the step of increasing the congestion window increases the congestion window when no negative acknowledgment is received upon expiry of the round-trip timer. Claim 7 has been amended to recite a step of setting a re-transmission time-out timer, and a step of generating, at the receiver, an acknowledgment in response to the keep-alive request. Claim 8 has been amended to recite a step of determining, at the transmitter, if an acknowledgment to the keep-alive request is not received before expiry of the re-transmission time-out timer. Claim 11 has been amended to recite a step of a first negative acknowledgment and a step of sending a second negative acknowledgment. Claim 15 has been amended to replace "the length of the congestion

---

The Honorable Commissioner of Patents  
and Trademarks

Page 10

window" with "the congestion window". Claim 17 has been amended to replace "round-up" with "round-trip".

Applicant has canceled claims 25 and 27 without prejudice.

Applicant has added new claims 28-30. Claim 28 is a system claim and corresponds to method claim 1. Claim 29 is a system claim and corresponds to method claim 11. Claim 30 is dependent on claim 22, and corresponds to method claim 15. No new matter has been introduced by way of the amendments to claims.

The Examiner rejected claims 1, 10-12, 14 and 22-23 under 35 U.S.C. 102(e) as being anticipated by Hamilton et al. (U.S. Patent No. 6,392,993), hereinafter referred to as Hamilton. The rejections are respectfully traversed for the reason as set out below.

As it is well known, TCP verifies the transmission of data. TCP schemes use cumulative acknowledgments ACKs for error recovery and congestion control. When a receiving node receives a packet from a transmitting node, the receiving node sends an ACK back to the transmitting node. Where a number of acknowledgments are not received, TCP assumes that the network is contested, and algorithm for error recovery and congestion control may be performed. However, ACKs pose problems, such as consumption of network resources.

According to the present invention, a link is established between a transmitter and a receiver through a TCP handshake. The transmitter and the receiver communicate with each other using TCP. However, the receiver does not send any acknowledgment to any packet from the transmitter unless it detects a missing packet. The receiver sends a negative acknowledgment (NACK) when it detects the missing packet. Therefore, acknowledgment traffic generated by TCP is significantly reduced.

According to claim 1, congestion control and error recovery is performed in response to the NACK. According to claim 11, a missing-pack timer is used for controlling transmission of NACKs. The missing-pack timer is set when the receiver sends the NACK (a first NACK). When the missing packet is not received before expiry of the missing-packet timer, a further NACK (a second NACK) is sent. According to claim 22, a round-trip timer is set upon sending each packet from the transmitter. TCP congestion window is adjusted in response to the NACK and the round-trip timer.

---

The Honorable Commissioner of Patents  
and Trademarks

Page 11

By contrast, Hamilton reduces the amount of network traffic and maintains reliability by building high-level protocols upon a basic UDP multicast protocol. Since UDP is inherently unreliable, reliability is added by layering additional protocols upon UDP (on col. 7, lines 53-58). Hamilton neither discloses nor suggests reducing acknowledgment traffic generated by TCP. Hamilton neither discloses nor suggests that a transmitter and a receiver communicate with each other using TCP, and the receiver is unresponsive to any packets from the transmitter unless the receiver detects the missing packet as recited in claims 1, 11 and 22.

Hamilton discloses, on col. 19, line 57-col. 20, line 11, that the NAK timer 152 is set when a missing packet is detected, and a NACK (NAK) is sent when the NAK timer 152 is expired. Hamilton neither discloses nor suggests sending a first NACK when a missing packet is detected, setting a missing-packet timer upon sending the first NACK, and sending a second NACK when the missing packet is not received before expiry of the missing-packet timer as recited in claim 11.

Hamilton neither discloses nor suggests adjusting a TCP congestion window in response to receipt of the negative acknowledgment, and expiry of the round-trip timer as recited in claim 22.

Hence, it is respectfully submitted that claims 1, 11 and 22 and their dependent claims 10, 12, 14 and 23 are new and unobvious in view of the cited reference. Applicant respectfully requests the Examiner to withdraw the rejections.

The Examiner rejected claims 2, 9 and 13 under 35 U.S.C. 103(a) as being unpatentable over Hamilton in view of Sen et al.(U.S. Patent No. 6,208,620), hereinafter referred to as Sen.

Sen discloses a wireless access gateway (WAG) 203, which includes a TCP-Aware Agent Sublayer (TAS) 209. The TAS 209 caches TCP packets and monitors acknowledgment ACK of return packets (col. 3, lines 42-58, col. 6, lines 45-53). It is clear that Sen uses acknowledgments ACKs of TCP packets (Figure 2).

As described above, Hamilton neither discloses nor suggests the subject matter of claims 1 and 11. Sen neither discloses nor suggests a receiver which is unresponsive to any packets from the transmitter unless the receiver detects the missing packet as

---

The Honorable Commissioner of Patents  
and Trademarks

Page 12

recited in claims 1 and 11. Since claims 2 and 9 depend on claim 1, and claim 13 depend on claim 11, the combination of Hamilton and Sen do not render claims 2, 9 and 13 unpatentable.

Hence, it is respectfully submitted that claims 2, 9 and 13 are patentable over the cited references. Applicant respectfully requests the Examiner to withdraw the rejections.

The Examiner rejected claim 3 under 35 U.S.C. 103(a) as being unpatentable over Hamilton in view of Gersht et al.(U.S. Patent No. 6,405,257), hereinafter referred to as Gersht.

Gersht discloses reducing the congestion window size by half on col. 1, lines 35-43. However, as described above, Hamilton neither discloses nor suggests the subject matter of claim 1. Gersht does not add any teaching to Hamilton to render claim 1 unpatentable. Since claim 3 depends on claim 1, the combination of Hamilton and Gersht do not render claim 3 unpatentable.

Hence, it is respectfully submitted that claim 3 is patentable over the cited references. Applicant respectfully requests the Examiner to withdraw the rejections.

The Examiner rejected claims 4-6, 15-16, 19 and 25 under 35 U.S.C. 103(a) as being unpatentable over Hamilton in view of Kumar (U.S. Patent No. 6,269,080).

Claims 4-6 depend on claim 1. As described above, Hamilton neither discloses nor suggests the subject matters of claim 1.

Claims 16 and 19 depend on claim 15. According to claim 15, a round-trip timer is used for adjusting a TCP congestion window. The congestion window is increased if no NACK is received at the transmitter before expiry of the round-trip timer. The congestion window is decreased if the NACK is received at the transmitter. Applicant trusts that Hamilton neither discloses nor suggests the subject matter of claim 15.

Claim 25 has been canceled without prejudice.

Kumar discloses a FDSP server 720 and an active receiver 722. The FDSP server 720 starts a timer with a limit of "T<sub>2</sub>" to measure the response time of the active receiver (on

---

The Honorable Commissioner of Patents  
and Trademarks

Page 13

col. 9, lines 22-23). If the FDSP server does not receive a NACK from the active receiver within expiry of the timer, "T<sub>2</sub>" is increased and a NACK solicitation is sent to the active receiver (on col. 14, lines 25-38). The Examiner stated that Kumar increases the congestion window in steps 1252 and 1257 of Figure 12B. However, in steps 1252 and 1257, Kumar increases the limit of "T<sub>2</sub>" for measuring the response time of the active receiver, and does not increase or decrease a TCP congestion window. Kumar neither discloses nor suggests increasing the TCP congestion window in response to the round-trip timer as recited in claims 4-6, 15 and 19.

Hence, it is respectfully submitted that claims 4-6, 15-16 and 19 are patentable over the cited references. Applicant respectfully requests the Examiner to withdraw the rejections.

The Examiner rejected claim 7 under 35 U.S.C. 103(a) as being unpatentable over Hamilton in view of Natarajan et al.(U.S. Patent No. 6,538,988), hereinafter referred to as Natarajan.

Natarajan discloses a keep-alive request 231, a keep-alive reply 232 and a timer (at step 223). However, Natarajan neither discloses nor suggests that the receiver is responsive only to the missing packet and the keep-alive request as recited in claim 7.

As described above, Hamilton neither discloses nor suggests the subject matter of claim 1. Claim 7 depends on claim 1. Therefore, the combination of Hamilton and Natarajan do not render claim 7 unpatentable.

Hence, it is respectfully submitted that claim 7 is patentable over the cited references. Applicant respectfully requests the Examiner to withdraw the rejections.

The Examiner rejected claim 17 under 35 U.S.C. 103(a) as being unpatentable over Hamilton in view of Kumar, further in view of Dudley et al.(U.S. Patent No. 5,754,754), hereinafter referred to as Dudley.

Kumar discloses, on col. 2, lines 60-63, that timers be set based on update requests generated by every node. Dudley discloses, on col. 9, lines 12-36 that a sender station 12 transmits a request for a status packet 60 to a receiver station 14 for determining, based on an ACK, whether the flow control mechanism is required. However, Kumar

---

The Honorable Commissioner of Patents  
and Trademarks

Page 14

and Dudley neither disclose nor suggest that the receiver is responsive only to the missing packet and the round-trip time update request as recited in claim 17.

Claim 17 depends on claim 15. As described above, Hamilton neither discloses nor suggests the subject matter of claim 15.

Hence, it is respectfully submitted that claim 17 is patentable over the cited references. Applicant respectfully requests the Examiner to withdraw the rejections.

The Examiner rejected claim 20 under 35 U.S.C. 103(a) as being unpatentable over Hamilton in view of Kumar, further in view of Natarajan.

As described above, Natarajan discloses a keep-alive request 231, a keep-alive reply 232, and a timer 223 in Figure 2. However, Natarajan neither discloses nor suggests that the receiver is responsive only to the missing packet and the keep-alive request as recited in claim 20.

Claim 20 depends on claim 15. As described above, Hamilton and Kumar neither disclose nor suggest the subject matter of claim 15.

Hence, it is respectfully submitted that claim 20 is patentable over the cited references. Applicant respectfully requests the Examiner to withdraw the rejections.

The Examiner rejected claims 24 and 27 under 35 U.S.C. 103(a) as being unpatentable over Hamilton in view of Chien et al.(U.S. Patent No. 5,815,667), hereinafter referred to as Chien.

Chien discloses adjusting transmission timeout function at a node 105a (on col. 6, lines 43-51), and adjusting acknowledgment timeout function at a destination node 105n (col. 6, lines 56-62). However, Chien neither discloses nor suggests means for adjusting a TCP congestion window in response to receipt of the NACK and expiry of the round-trip timer, and the means responds to expiry of the re-transmission time-out timer as recited in claim 24.

Claim 24 depends on claim 22. As described above, Hamilton neither discloses nor suggests the subject matter of claim 22. Claim 27 has been canceled without prejudice.

---

The Honorable Commissioner of Patents  
and Trademarks

Page 15

Hence, it is respectfully submitted that claim 24 is patentable over the cited references.  
Applicant respectfully requests the Examiner to withdraw the rejections.

Applicant respectfully requests reconsideration of this application, based on the  
foregoing amendments and remarks.

Respectfully Submitted,

  
\_\_\_\_\_  
John D. Harris  
Registration No. 39,465

JDH/SM/cw

c/o

GOWLING LAFLEUR HENDERSON LLP  
160 Elgin Street, Suite 2600  
Ottawa, Ontario  
K1P 1C3  
CANADA

Telephone: (613) 233-1781  
Facsimile: (613) 563-9869

Date: July 23, 2003